REMARKS

This application has been reviewed in light of the Office Action dated March 7, 2011. Claims 26 to 47 and 51 to 53 are presented for examination, of which Claims 26, 46, and 47, are in independent form. Claims 26, 43 to 47, and 51 to 53 have been amended. The substance of Claims 48 to 50 has been incorporated, respectively, into independent Claims 26, 46, and 47, and Claims 48 to 50 have been cancelled; these actions are taken without prejudice or disclaimer of subject matter. Favorable reconsideration and further prosecution are requested.

Claims 43, 44, and 46 have been objected to for the use of the British spelling "colour". Claims 43, 44, and 46 have been amended to change "colour" to read --color--. Applicants respectfully request the withdrawal of the objection to Claims 43, 44, and 46.

Claims 47, 50, and 53 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 6,498,355 ("Harrah"). Claims 26 to 28, 35, and 38 to 41, 45, 48, and 51 were rejected under 35 U.S.C. § 103(a) over Harrah in view of U.S. Patent 6,498,355 (Kanji); Claim 42 was rejected over Harrah, Kanji, and further in view of U.S. Patent 5,512,131 (Kumar); Claims 43 and 44 were rejected over Harrah, Kanji, and Kumar, and further in view of U.S. Patent 6,682,331 (Peh). Applicants submit that independent Claims 26, 46, and 47, together with the remaining claims dependent therefrom, are patentably distinct from the applied art for at least the following reasons.

Claim 26 is directed to a light-emitting diode arrangement. The light-emitting diode arrangement includes a light-emitting diode chip, a multi-layer board having a base of a thermally well-conducting material. The material includes a metal and the base

is a core of the board and configured for heat dissipation. The arrangement also includes an electrically insulating and thermally conducting connection layer between an emission surface of the light-emitting diode chip and the board. Between the light-emitting diode chip and the base of the board there is arranged an intermediate carrier separate from the light-emitting diode chip and the base of the board. The intermediate carrier is electrically contacted with the light-emitting diode chip, and the intermediate carrier includes an aluminum nitride substrate. In addition, there is no electrically conducting layer between overlapping areas of the intermediate carrier and the multi-layer board.

One feature of Claim 26, which has been incorporated substantially from Claim 48 (now cancelled), is that there is no electrically conducting layer between overlapping areas of the intermediate carrier and the multi-layer board. By virtue of this arrangement, the construction of the intermediate carrier provides heat transfer characteristics and electrical isolation so that, in the context of Claim 26, no additional electrically conducting layer is needed.

Harrah relates to light emitting diodes and arrays of light emitting diodes. As understood by Applicants, Harrah teaches an LED arrangement that includes a metal substrate 6 that is said to spread and dissipate heat flowing from an LED. See, e.g., Harrah at column 4, lines 14 and 15, and column 5, lines 15, 16, 54 and 55. According to Harrah, the combination of solder bumps 32, submount 30, thermal contact 46, and thermally conductive material 24 are intended to provide a low thermal-resistance path for heat to flow from an LED 28 to a metal substrate 6. See, e.g., Harrah, at column 5, lines 13 to 16.

The structures described in Harrah require a complex layering arrangement in comparison to the arrangement recited in Claim 26. The complex structures in Harrah result from the use of an electrically conducting material (i.e., metal pad) for thermal contact 46, which requires the provision of an additional dielectric layer 48. The combination of the thermal contact 46 and the dielectric layer 48 increases the thermal resistance of the heat flow path.

Moreover, as discussed at col. 3, lines 17-53, of Harrah, thermally conductive material 24 may be conventional reflowed solder deposited in via 12 by conventional means, diamond filled epoxy, silver filled epoxy, or metals conventionally plated in via 12. Without being bound by theory, Applicants submit that one of ordinary skill in the art would appreciate that the aforementioned listed examples of thermally conductive material 24 also share the property of being electrically conductive.

Further, thermal contact 46 and thermally conductive material 24 are both seen to be between overlapping areas of submount 30 and the board 6. Therefore, Applicants submit that Harrah teaches an arrangement having at least one electrically conducting layer (i.e., thermal contact 46, thermally conductive material 24) between overlapping areas of submount 30 and metal substrate 6. Applicants submit that nothing in Harrah would teach or suggest any structure in which there is not an electrically conducting layer between overlapping areas of the intermediate carrier and the multi-layer board, as provided for in Claim 26.

Accordingly, Applicants submit that Claim 26 is patentable over Harrah and respectfully request withdrawal of the rejection under 35 U.S.C. § 103(a).

Independent Claims 46 and 47 recite features similar to those discussed above with respect to Claim 26, and are believed to be patentable over Harrah for at least the same reasons as discussed above in connection with Claim 26.

Nothing has been found in the other art of record that, in Applicants' opinion, would remedy the deficiencies of the art discussed above, as references against independent claims 26, 46, and 47. Therefore, those claims are respectfully submitted to be patentable over the art of record.

The other claims in this application depend from one or another of Claims 26, 46, and 47, and therefore are submitted to be patentable for at least the same reasons. Because each dependent claim also is deemed to define an additional aspect of the invention, however, individual consideration or reconsideration, as the case may be, of the patentability of each claim on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and an early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our Costa Mesa, CA office by telephone at (714) 540-8700. All correspondence should continue to be directed to our below listed address.

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